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# COMPUTER PROCUREMENT

## Information on Defense Department's CAD/CAM Acquisitions

GAO

**United States**
**General Accounting Office**
**Washington, D.C. 20548**

**Information Management and**
**Technology Division**

B-224148

January 19, 1989

The Honorable John P. Murtha
Chairman, Subcommittee on Defense
Committee on Appropriations
House of Representatives

Dear Mr. Chairman:

In a June 1, 1988, letter, your predecessor expressed interest in the extent to which the Defense Department is procuring Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) equipment and whether these procurements are being properly planned and coordinated. Also, he requested that we review the Defense Department's efforts to acquire this technology. During a subsequent discussion with your office, we agreed to provide information on (1) Defense CAD/CAM procurements underway, including the procurement approaches being used; (2) Defense initiatives to consolidate procurements either within or between components, including use of the Navy's planned CAD/CAM contracts; and (3) the Office of the Secretary of Defense's (OSD) efforts to guide and coordinate the components' CAD/CAM procurements.

## Scope and Methodology

We focused our review on three Defense components—the Army, Air Force, and Defense Logistics Agency (DLA)—because OSD records indicate that the services and DLA are the principal users of CAD/CAM, apart from the Navy. We excluded the Navy from our review because we recently reported on the Navy's CAD/CAM acquisition.[1] Within OSD, we focused on the Office of the Assistant Secretary of Defense (Production and Logistics) and the Comptroller of the Department of Defense, the only offices we identified as involved in Defense activity to acquire CAD/CAM equipment. Our work included interviews with officials in planning, procurement, and review functions. It also included analyses of relevant CAD/CAM planning and contracting documentation as well as applicable Defense directives and instructions. A detailed explanation of our scope and methodology is contained in appendix I.

[1]Computer Procurement: Issues Concerning Technical Specification for Navy's CAD/CAM Acquisition (GAO/IMTEC-88-16BR, Mar. 3, 1988), and Computer Procurement: Navy CAD/CAM Acquisition Has Merit but Management Improvements Needed (GAO/IMTEC-88-22, May 11, 1988).

## Background

CAD/CAM is a tool for automating the engineering functions used in designing, manufacturing, and maintaining items such as ships, submarines, aircraft, and buildings. With CAD/CAM, a product or item is quickly drawn and easily modified on a computer screen, and the computer can model each drawing before production begins. Following product design, CAD/CAM allows for automated product manufacture and provides a computerized record of the product. Using this technology, the cost and time to develop and maintain products can be reduced while product quality and reliability can be enhanced. The Defense Department is a major user of this technology.

## Planned/Ongoing Procurements Serve Mostly Local Needs

The Army, Air Force, and DLA currently use CAD/CAM equipment, and are buying or planning to buy more. None of the three, however, has ongoing or planned procurements as large as the Navy's.

The Navy is in the midst of a large CAD/CAM procurement and is planning to award five indefinite-quantity contracts sometime in 1990. Although the Navy has yet to officially specify a dollar estimate for the contracts, commercial estimates are as high as $500 million. The five contracts, one for each of the Navy's five system commands,[2] are intended to provide state-of-the-art, off-the-shelf hardware and software to meet different users' needs while also providing standard system features for all commands.

The Army had 12 ongoing procurements as of September 30, 1988, totaling about $120 million, including one requirements contract that has a $101 million delegation of procurement authority. Under this contract, the Corps of Engineers is authorized to acquire up to $51 million worth of equipment. Other defense agencies, and the National Security Agency, are authorized to spend up to $50 million in support of architecture, engineering, or construction functions similar to those of the Corps of Engineers.

The Air Force is now in the early stages of defining its long-term CAD/CAM requirements. Its ongoing procurements total about $11 million, not including an indefinite-quantity contract with a $114 million delegation of procurement authority to purchase hardware for scientific and engineering applications. Some of this hardware will run CAD/CAM software;

[2]The five system commands are the Naval Sea Systems Command, Naval Air Systems Command, Naval Facilities Engineering Command, Naval Supply Systems Command, and Space and Naval Warfare Systems Command.

however, Air Force officials could not specify what portion of the $114 million relates specifically to CAD/CAM applications. DLA is a small user with past and planned purchases totaling about $500,000.

The components' procurement approaches vary. Generally, most procurements are being conducted by individual field activities to satisfy localized needs. However, the Army and the Air Force each have one centrally managed procurement that can be used by multiple field activities. Additionally, the Air Force and a number of Army commands are examining the technical specification for the Navy's planned CAD/CAM contracts to see if it can be used to satisfy their respective requirements. (Apps. II, III, and IV contain additional information on Army, Air Force, and DLA procurements, respectively.)

## OSD Involvement Minimal

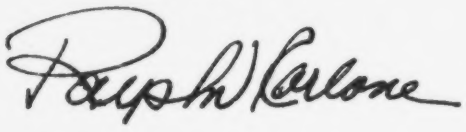
OSD has encouraged Defense components to use the Navy's planned CAD/CAM contracts as a means of satisfying their respective needs. However, according to officials in the Office of the Assistant Secretary of Defense (Production and Logistics), no further OSD involvement is planned. Further, they do not see a role for OSD in Defense efforts to acquire CAD/CAM, except when a given procurement requires OSD's approval. Procurements requiring OSD's approval are those that have total estimated program costs in excess of $100 million, have estimated program costs in excess of $25 million in any single year, or are designated as special interest by OSD. (App. V contains additional information on OSD's role in Defense actions to acquire this equipment).

We discussed the contents of this report with Army, Air Force, DLA, Navy, and OSD officials, and have incorporated their views where appropriate. Our work was performed in accordance with generally accepted government auditing standards.

We are providing copies of this report to the Secretaries of Defense, Army, Air Force, and Navy, and to the Director, DLA. We are also providing copies to the House and Senate Armed Services Committees, the House Government Operations Committee, the Senate Governmental Affairs Committee, and the House and Senate Appropriations Committees. We will make copies available to other interested parties upon

request. This report was prepared under the direction of William S. Franklin, Associate Director. Other major contributors are listed in appendix VI.

Sincerely yours,



Ralph V. Carlone
Assistant Comptroller General

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### Abbreviations

| | |
|---|---|
| CAD/CAM | Computer Aided Design/Computer Aided Manufacturing |
| DLA | Defense Logistics Agency |
| GAO | General Accounting Office |
| IMTEC | Information Management and Technology Division |
| OSD | Office of the Secretary of Defense |

# Objectives, Scope, and Methodology

Interest in the Defense Department's acquisition of CAD/CAM equipment prompted the former Chairman, Subcommittee on Defense, House Committee on Appropriations, to request that we review Defense efforts to acquire this technology. On the basis of the former Chairman's request and subsequent discussions with his office, we agreed to provide information on

- CAD/CAM procurements that are occurring within Defense components, including the procurement approaches being used;
- Defense efforts to consolidate CAD/CAM procurements either within or between components, including the use of the Navy's planned contracts; and
- OSD's efforts to guide and coordinate the components' CAD/CAM procurements.

In developing this information, we focused on three Defense components—the Army, Air Force, and DLA. We selected these for two reasons. First, OSD records indicated the services and DLA to be the primary Defense users of CAD/CAM equipment. Second, we recently reported on the Navy's efforts to acquire this type of equipment.[1] Also, in developing this report, we focused on two OSD offices—the Office of the Assistant Secretary of Defense (Production and Logistics) and the Office of the Comptroller of the Department of Defense—because they are the only OSD offices that we identified as having potential involvement in Defense efforts to acquire CAD/CAM equipment.

Our review approach included interviews with Army, Air Force, and DLA officials who perform functions relevant to the procurement of these systems, including requirements determination, contracting and contract management, and acquisition oversight. It also included examination of applicable documentation such as studies of components' current uses and plans for future acquisitions, contracts, and solicitation documents for procurements currently underway; Defense reports on contract expenditures; and Defense directives and instructions governing the procurement of computer systems such as CAD/CAM. Additionally, our approach included interviews with OSD officials and examination of documentation germane to OSD's role in Defense's procurement of CAD/CAM.

Finally, our review included an automated search of the Commerce Business Daily for reference to Defense CAD/CAM procurements, either

[1]GAO/IMTEC-88-16BR, Mar. 3, 1988; and GAO/IMTEC-88-22, May 11, 1988.

requests for proposals or contract awards, announced from February 1986 through September 1988.

We performed our work from July 1988 through September 1988, primarily at (1) component headquarters offices and OSD offices in Washington, D.C., and (2) selected component field activities. The principal headquarters offices contacted were:

- Army: Office of the Director of Information Systems for Command, Control, Communications, and Computers.
- Air Force: Deputy Chief of Staff for Logistics and Engineering; Deputy Chief of Staff for Command, Control, Communications and Computers.
- Defense Logistics Agency: Technical and Logistics Data Division.
- Office of the Secretary of Defense: Office of the Assistant Secretary of Defense (Production and Logistics); the Office of the Comptroller of the Department of Defense.

We discussed the contents of this report with Army, Air Force, DLA, Navy, and OSD officials and have incorporated their views where appropriate. Our work was performed in accordance with generally accepted government auditing standards.

# Army CAD/CAM Procurements

The Army has used CAD/CAM since the 1970s and is buying more of the technology. As of September 30, 1988, it had 12 ongoing procurements, totaling about $120 million, including one requirements contract that has a $101 million delegation of procurement authority and that can be used by the Army and other agencies. The Army's acquisition approach for its procurements includes both large-scale, centrally managed contracts as well as smaller, locally awarded and managed contracts. A number of Army commands are considering whether their future needs can be satisfied by the Navy's planned CAD/CAM contracts.

## The Army as CAD/CAM User

The Army first introduced CAD/CAM to its arsenals and research and development laboratories to aid in the design and development of weapons systems. Since then it has employed robotics at depots and ammunition plants as a substitute for humans in potentially hazardous positions, and it has begun using CAM to produce small-caliber ammunition.

The Army has two primary CAD/CAM users—the Army Materiel Command and the Corps of Engineers. The Army Materiel Command, which operates Army arsenals, depots, and other facilities, is the Army's largest user. An Army Materiel Command survey dated April 1988 shows that the Command has invested about $430 million in a wide range of CAD/CAM technology.

The Army's other primary user is the Corps of Engineers, which uses CAD for architecture, engineering, and construction functions. Unlike the Army Materiel Command, the Corps does not manufacture equipment, machinery, or spare parts, and thus its investment is limited to design and drafting equipment.

## Army Materiel Command Procurements

Our review identified 10 CAD/CAM procurements in the Army Materiel Command—6 contracts and 4 requests for proposals (see table II.1). The 6 contracts total about $14 million, and the requests for proposals total about $5.5 million. Each of these procurements is being conducted locally by Army Materiel Command field activities. According to the April 1988 Army Materiel Command study, planned investments between 1989 and 1992 will total about $20 million.

**Table II.1: Army Materiel Command CAD/CAM Procurements as of September 30, 1988**

Dollars in thousands

| Location | Contract Value | Contract Awarded? | Expenditures[a] |
|---|---|---|---|
| Watervliet Arsenal | $4,653 | yes | $4,395 |
| Tank and Automotive Command | 3,488 | yes | 86 |
| Redstone Arsenal | 4,897 | yes | 3,078 |
| Redstone Arsenal | 503 | yes | none |
| Redstone Arsenal | 233 | yes | none |
| Redstone Arsenal | 114 | yes | none |
| Anniston Army Depot | 200[b,c] | no | none |
| Rock Island Arsenal | 2,500[c] | no | none |
| Corpus Christi Depot | 791[c] | no | none |
| Tobyhanna Depot | 2,000[c] | no | none |
| **Total** | **$19,379** | | **$7,559** |

[a]As of June 30, 1988.

[b]Estimated costs of 1-year lease. The contract is planned to have a purchase option.

[c]Values of contracts not yet awarded estimated by activity contracting officials.

## Corps of Engineers Procurements

Our review identified two Corps of Engineers procurements as of September 30, 1988 (see table II.2). One of the two is a requirements contract with a $101 million procurement limit, intended to fulfill the design and drafting requirements of all Corps districts. Although a total dollar value is not specified in the contract, the delegation of procurement authority limits Corps purchases against the contract to $51 million, and Corps officials told us that this limit would likely be reached. As of September 1988, 24 of the 39 Corps district offices had submitted purchase orders against the contract totaling $12.1 million. Additionally, this contract has a $50 million delegation of procurement authority, which is available to other defense agencies and the National Security Agency. The other Corps contract is a local procurement for microcomputer drafting software, which is not available from the requirements contract.

**Table II.2: Corps of Engineers CAD/CAM Procurements as of September 30, 1988**

Dollars in thousands

| Location | Contract Value | Contract Awarded? | Expenditures[a] |
|---|---|---|---|
| Corps of Engineers | $101,000[b] | yes | $6,662 |
| Corps of Engineers, Sacramento District | 43 | yes | none |
| **Total** | **$101,043** | | **$6,662** |

[a]As of June 30, 1988

[b]Total delegation of procurement authority

## Army Efforts to Consolidate Procurements

The Army is involved in a large-scale, centrally managed CAD/CAM acquisition, and is considering the use of the Navy procurements. The Corps' requirements contract is available to its 39 district offices, as well as to other defense agencies, and the National Security Agency, with a need the contract can satisfy. Additionally, the Office of the Director of Information Systems for Command, Control, Communications, and Computers has solicited Army commands for interest in participating in the Navy's planned CAD/CAM contracts. As of September 1988, 11 Army activities had expressed interest in reviewing the Navy's Request for Proposals when it is available.

# Air Force CAD/CAM Procurements

The Air Force began using CAD/CAM technology in the 1970s and has continued to acquire the technology. As of September 30, 1988, the Air Force had seven ongoing procurements totaling about $11 million. The Air Force also had an indefinite-quantity contract with a $114 million delegation of procurement authority for scientific and engineering computers, which may be used for CAD/CAM. Air Force acquisition strategies include large, centrally managed contracts as well as small, locally awarded contracts managed by field activities. The Air Force is exploring opportunities for CAD/CAM procurement consolidation within the Air Force itself and between the Air Force and the Navy.

## The Air Force as CAD/CAM User

Two Air Force commands acquire the majority of CAD/CAM technology used by the service: the Air Force Systems Command and the Air Force Logistics Command. According to a November 1988 Air Force survey, the acquisition cost of the Systems Command's current CAD/CAM inventory is about $9 million, while the Logistics Command's totals about $43 million. The Strategic Air Command and the Tactical Air Command also use and are acquiring this type of equipment.

The Air Force uses CAD/CAM technology for a variety of applications. The Air Force Systems Command's research laboratories and test centers use it for designing and developing weapons systems. The Air Force Logistics Command uses this technology at its five Air Logistics Centers for maintaining aircraft and developing procurement specifications for existing equipment. As of September 30, 1988, the Air Force Logistics Command was not conducting any CAD/CAM procurements. The Strategic Air Command and the Tactical Air Command use the technology for such applications as reproducing old technical drawings and designing printed circuit boards.

## Air Force Systems Command Procurements

The Air Force Systems Command is conducting one centrally managed procurement, plus several localized procurements (see table III.1). The centrally managed procurement is an Air Force-wide, scientific and engineering workstations, indefinite-quantity contract with a $114 million delegation of procurement authority. This contract provides for the purchase of hardware that can be used for a number of applications, including CAD/CAM. However, according to a Systems Command contracting official, it is not known how many of these workstations will be used for CAD/CAM applications. The contract is expected to reach its dollar limit in 1989.

**Table III.1: Air Force Systems Command CAD/CAM Procurements as of September 30, 1988**

Dollars in thousands

| Location | Contract Value | Contract Awarded? | Expenditures[a] |
|---|---|---|---|
| Aeronautical Systems Division, Wright-Patterson Air Force Base | $114,300[b] | yes | $49,401 |
| 4950th Test Wing, Wright-Patterson Air Force Base | 6,924 | yes | none |
| Aeronautical Propulsion and Flight Dynamic Laboratory, Wright-Patterson Air Force Base | 2,465 | yes | none |
| 6585 Test Group, Eglin Air Force Base | 228 | yes | none |
| **Total** | **$123,917** | | **$49,401** |

[a]As of June 30, 1988.

[b]Delegation of procurement authority

## Other Air Force CAD/CAM Procurements

The Strategic Air Command and the Electronic Security Command are each conducting one CAD/CAM procurement, and the Tactical Air Command is conducting two (see table III.2). They are all being conducted at field activities within the two commands to satisfy local needs.

**Table III.2: Other Air Force CAD/CAM Procurements as of September 30, 1988**

Dollars in thousands

| Location | Contract Value | Contract Awarded? | Expenditures[a] |
|---|---|---|---|
| Tactical Air Command, Luke Air Force Base | $1,224 | yes | none |
| Electronic Security Command, Kelly Air Force Base | 150 | yes | none |
| Strategic Air Command, Whiteman Air Force Base | 97 | yes | none |
| Tactical Air Command, Shaw Air Force Base | 56 | no | none |
| **Total** | **$1,527** | | |

[a]As of June 30, 1988.

## CAD/CAM Procurement Consolidation Efforts

The Air Force is exploring ways to consolidate its CAD/CAM procurements. For example, it has established a policy group to formulate a long-term Air Force acquisition strategy, taking into account the service's need for data exchange among users. The policy group plans to issue guidance to ensure that systems acquired will meet certain common standards. The group also plans to evaluate the feasibility of using the Navy's planned contracts to meet Air Force requirements. Initially,

the Air Force will provide the Navy's technical specification to its major commands, including the Logistics Command and Systems Command. Those commands will determine how well their requirements would be met by the Navy contracts.

Additionally, the Air Force Logistics Command has a CAD/CAM steering committee that is surveying the command's need for a single, command-wide acquisition. The steering committee is evaluating alternative CAD/CAM acquisition options, including the possibility of using the planned Navy contracts.

According to an Air Force Systems Command official, the command has established a steering committee to address CAD/CAM requirements on a command-wide basis. The official added that the committee will be similar to that of the Air Force Logistics Command. The Systems Command does have one representative on the Logistics Command's CAD/CAM steering committee to informally coordinate between the two commands. Additionally, the Systems Command has an informal review underway to evaluate whether the hardware specifications of the Navy's planned contracts will satisfy its scientific and engineering workstations requirements when the command's current indefinite-quantity workstations contract expires.

# DLA CAD/CAM Procurements

DLA uses CAD/CAM to a much lesser extent than do the services. Our review identified three DLA facilities that use CAD systems, but identified no ongoing and just one planned procurement of the technology. Because of its small CAD requirements, DLA is not planning to participate in the Navy's planned CAD/CAM contracts, according to the director of DLA's Technical and Logistics Data Division.

## DLA as CAD/CAM User

Unlike the services that design and build weapon systems, DLA's mission is to supply the services with common items or spare parts. As a result, DLA's principal need for CAD/CAM is limited to drafting applications used in preparing drawings of the parts it supplies. One DLA user of the equipment is the Defense Logistics Service Center, which has a single CAD workstation to incorporate parts drawings in DLA's catalog of standard parts. Another user, the Defense Electronics Supply Center, uses CAD to explore opportunities for standardizing electronic systems' components. The third DLA user is a depot in Ogden, Utah, that uses a CAD system in designing and maintaining it' buildings.

## DLA Procurements and Consolidation Efforts

DLA's one planned procurement is for three workstations and has an estimated contract value of $117,000. DLA is not planning to participate in the Navy's CAD/CAM contracts. According to the director of DLA's Technical and Logistics Data Division, DLA does not need CAD/CAM equipment as sophisticated as that required by the services. The director cited DLA's limited CAD needs as justifying DLA's plans to not participate in the Navy's procurement. DLA has, however, used the Army Corps of Engineers' contract to acquire $400,000 worth of CAD equipment for the Ogden depot. According to the staff director of DLA's Office of Installation Services and Environmental Protection, the Ogden depot is serving as a pilot site for testing the use of CAD equipment. Other DLA depots may acquire similar equipment in the future.

# OSD Role in Defense CAD/CAM Procurements

Unless a given CAD/CAM procurement within the Defense Department qualifies as a major system requiring OSD's approval,[1] OSD does not get involved in the procurement. According to officials in the Office of the Assistant Secretary of Defense (Production and Logistics), apart from the Navy's acquisition, OSD has not been involved in any Defense procurements specifically for CAD/CAM. In addition, OSD does not have instructions or directives strictly for CAD/CAM procurements. These officials expressed confidence that the existing regulations governing computer system acquisitions are sufficient to guide actions to acquire CAD/CAM.

OSD has encouraged Defense components to use the Navy's planned contracts. In an April 11, 1988, letter, the Assistant Secretary of Defense (Production and Logistics) promoted the idea of using the planned Navy contracts to satisfy CAD/CAM needs of the Army, Air Force, and DLA to the maximum extent possible. Officials in the Office of the Assistant Secretary of Defense (Production and Logistics) stated that this letter responded to a perceived opportunity for the services to save time and money by using the Navy contracts instead of developing their own specifications and awarding their own contracts. They foresaw no further OSD involvement in determining whether the components should buy CAD/CAM, separately or jointly.

[1] According to Department of Defense Directive 7920.1, a major automated information system is one that has total estimated program costs in excess of $100 million, has estimated program costs in excess of $25 million in any single year, or is designated as special interest by OSD. OSD exercises its approval authority over these major systems through its Major Automated Information System Review Council.

# Major Contributors to This Report

| | |
|---|---|
| Information Management and Technology Division, Washington, D.C. | William S. Franklin, Associate Director, (202) 275-3188<br>John B. Stephenson, Group Director<br>Randolph C. Hite, Evaluator-in-Charge<br>David R. Turner, Evaluator<br>Gwendolyn A. Dittmer, Evaluator<br>Lisa T. Pittelkau, Evaluator |